

JEFFERSON JOURNAL

January/February 2022



**Turning A CBD
Farming Byproduct
Into Feed For Cows,
Chickens And Sheep**



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JEFFERSON JOURNAL (ISSN 1079-2015), January/February 2022, volume 46 number 1. Published bi-monthly (six times a year) by JPR Foundation, Inc., 1250 Siskiyou Blvd., Ashland, OR 97520. Periodical postage paid at Ashland, OR and additional mailing offices.

POSTMASTER: Please send address changes to The Jefferson Journal, 1250 Siskiyou Blvd. Ashland, OR 97520

Jefferson Journal Credits:

Editor: Abigail Kraft

Managing Editor: Paul Westhelle

Poetry Editor: Amy Miller

Design/Production: Impact Publications

Printing: Journal Graphics



Jefferson Public Radio is a community service of Southern Oregon University.

The JPR Foundation is a non-profit organization that supports JPR's public service mission.



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COVER: Hemp crop in Jackson County, Ore.

PHOTO: GORDON JONES, ASSISTANT PROFESSOR OF PRACTICE IN GENERAL AGRICULTURE AT SOUTHERN OREGON RESEARCH AND EXTENSION CENTER.

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The Path Ahead

2021 was another doozy. The aftermath of a rugged national election that culminated in violence in our nation's capital. Dashed hopes of a definitive end to the pandemic. And, a deepening political divide that has exposed the frayed threads that hold our democracy together.

As we usher in a new year here at JPR with cautious optimism (it's gotta get better, right?), there are several themes that will guide our work and service to the region.

- 1. Knowledge Is Power.** We'll continue to be a resource that elevates the power of facts, knowledge and critical thinking over the power of misinformation. The destructive forces of misinformation that have been amplified by partisan "news" outlets and social media are now established parts of our information ecosystem and baked into our society. We'll need to address these forces head-on as an ongoing part of our work if we expect to make progress toward achieving the aspirations of the mission we share with NPR "to create a more informed public – one challenged and invigorated by a deeper understanding and appreciation of events, ideas and cultures."
- 2. Deeper Local News.** We'll expand and strengthen our local and regional journalism. As the number of local journalists in communities across the country continues to decline due to the changing economics of the news business, we'll add another full-time reporter in the coming year so that we can cover a wider range of issues and voices from a broader sweep of the communities we serve. We'll also seek to develop new collaborations with other journalism organizations that will help us leverage our resources to create deeper, more impactful work.
- 3. Paying It Forward.** We'll actively work to mentor the next generation of journalists. JPR is an ideal place to learn the craft of journalism – large enough to have a team of skilled professional colleagues from which to learn, yet small enough to gain practical experience covering a diverse array of issues. We'll continue working with Southern Oregon University students to provide meaningful experiential learning opportunities and also maintain our formal internship program with The Charles Snowden Program for Excellence in Journalism at the University of Oregon.

- 4. Bringing Stages Back To Life.** We'll be a catalyst for the return of live music to stages across our region. Losing live music events during the pandemic has been detrimental to artists, performance venues and audiences. Through our own presenting activities, like the *One World Performance Series*, and by partnering with non-profit presenting groups and other venues, we'll work to re-establish our region as a home for great live music while supporting the artists who create it.
- 5. More Local.** We'll continue to partner with the many accomplished arts and cultural organizations in the region to create and broadcast compelling local programming. Examples of this work include the radio/podcast special we produced and broadcast this past Halloween adapted from the Camelot Theatre's production of *The Strange Case of Dr. Jekyll & Mr. Hyde* and the holiday special we aired on December 24th that was adapted from The Collaborative Theatre Project's production of *Sherlock Holmes and the Case of the Christmas Goose*.

As we set our path for the coming year, we recognize the special relationship we enjoy with our listeners, who provide the resources we need, year after year, to do our best work. We're truly grateful to be serving one of the most generous public radio audiences in the nation. Here's to 2022 – may it be filled with the perfect balance of calm and excitement ... and plenty of time to listen to great radio!



Paul Westhelle is
JPR's Executive Director.



Turning A CBD Farming Byproduct Into

What happens if you feed cannabis to sheep?

It's a question you might expect from someone using cannabinoids, rather than studying it.

But researchers in Oregon are asking this question – specifically about hemp – in an effort to unlock its potential as a cash crop.

The hemp industry in Oregon currently produces two main cannabidiol, or CBD, products: oil and a more-specialized smokable flower. Growers dealing in the CBD oil market will often hire processors to extract the oil from the hemp. This process leaves large amounts of plant material behind. And right now, that biomass has little value.

"Nobody knows what to do with that material. So, if you just utilize this as an animal feed, it's going to really be a cheap source

of another feed for the animals," said Serkan Ates, who teaches in the Animal and Rangeland Sciences Department at Oregon State University.

The OSU scientists working with the school's Global Hemp Innovation Center are exploring whether this spent-hemp biomass can be used to feed sheep, dairy cows and poultry.

"We see that there's a big potential so far," Ates said.

For the past couple of years, his team has been conducting research trials – substituting different amounts of animal feed for hemp in lambs and cows. They're testing the impact of that hemp on animal growth, health and behavior, as well as whether any THC lingers in the animals' systems.

"The material is available. We have a lot of cattle in Oregon, a lot of dairy farms. Not so many sheep, but we still also have sheep, too. So technically we should be able to feed this material to those livestock," Ates said.



By Jes Burns

Feed For Cows, Chickens And Sheep

The answers they find could open up a new market for an industry that's gotten off to a rocky start.

"I don't know that the fiber — or the post-extracted biomass — is the most valuable part of the plant," said Jacob Crabtree, CEO of Oregon-based Columbia Hemp Trading Company. "But when you look at a sustainable marketplace and not wasting any part of this plant and getting the most value out of it, you absolutely have to look at those markets."

RIGHT: In this May 19, 2015 photo, a bag of shredded hemp on the way to being turned into pulp and used for paper and other products sits on a table, at Pure Vision Technology, a biomass factory in Ft. Lupton, Colo.

BRENNAN LINSLEY / AP



Growing pains

After the United States fully legalized growing industrial hemp in 2018, Oregon growers and processors jumped in with both feet. But they quickly found the pool was cold and far shallower than expected.

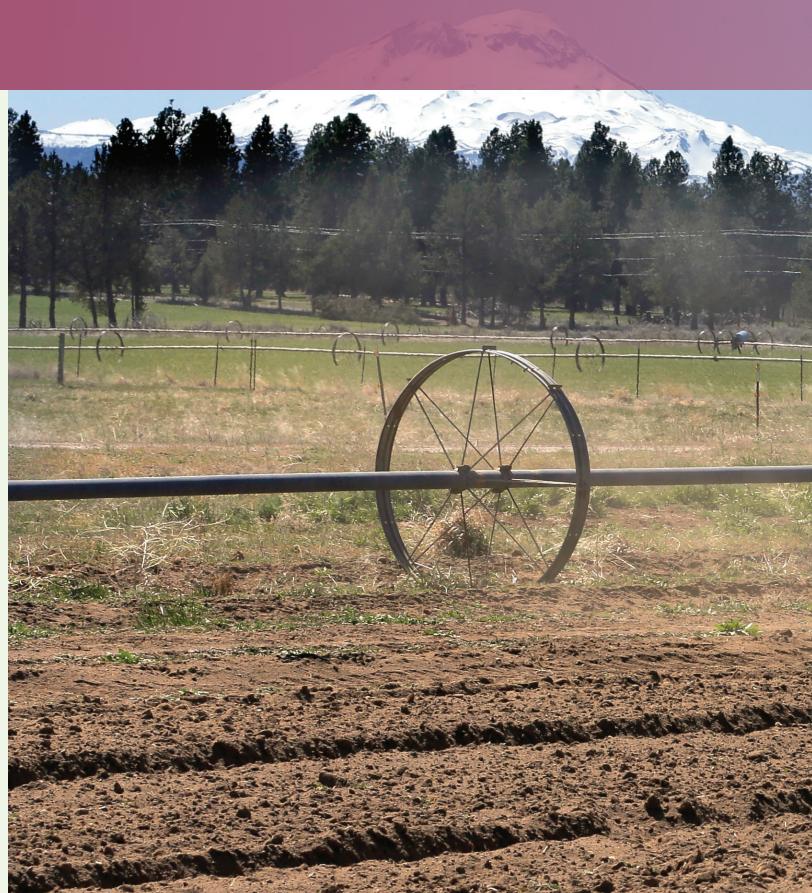
Hemp hasn't been the agricultural Xanadu many had thought it would be.

"I think during the 2019 season it felt like a gold rush. I'm not sure if I'll ever watch such a fast change in agricultural land use again from a crop that was previously prohibited," said Gordon Jones, who works with hemp growers as part of his position at OSU's Southern Oregon Research and Extension Center in Central Point.

Thousands of acres were converted to hemp production statewide. The Rogue Valley in Southern Oregon had some of the highest concentrations of hemp growing in the country. Early on, pear orchards were removed, hay production replaced and fallow fields were suddenly rowed in the black plastic so commonly used to grow hemp.



Gordon Jones



Map of Registered Outdoor Hemp Acreage – September 2021

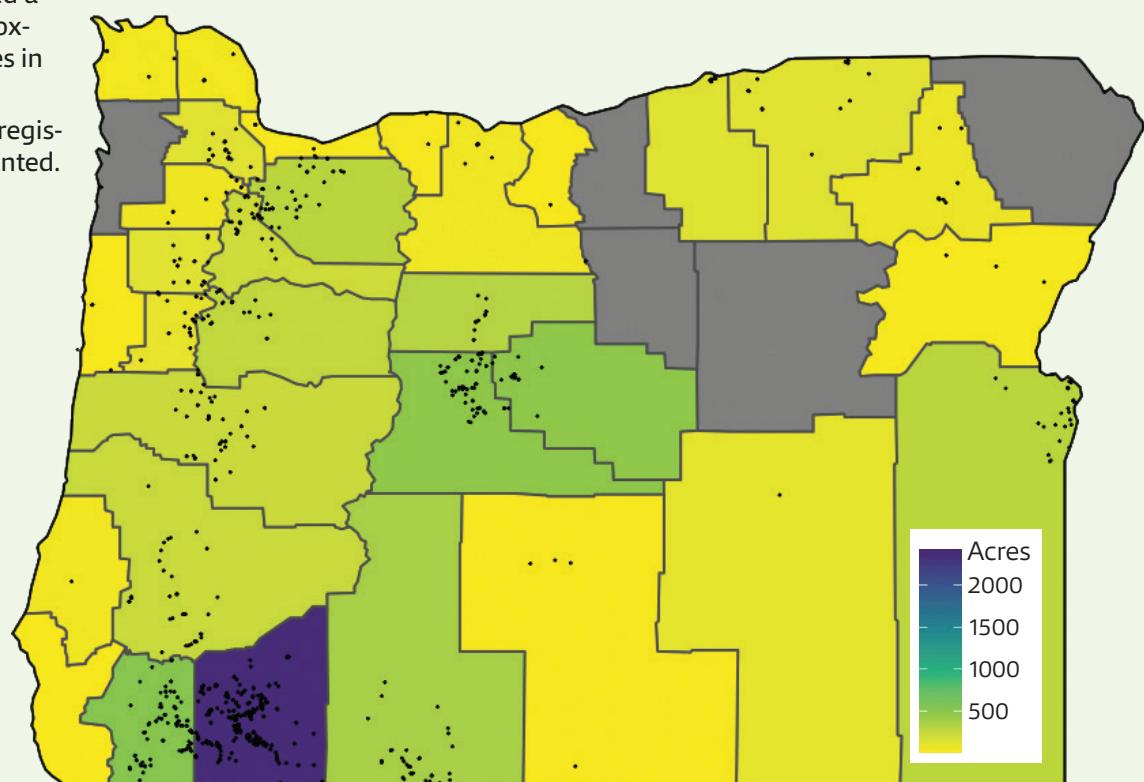
Oregon Department of Agriculture has updated their information on the number of acres of hemp registered in Oregon for the 2021 season. By September 24, 2021 there were 7161 acres registered statewide. The state has tracked a steady decline recording approximately 64,000 registered acres in 2019 and 27,500 in 2020.

It should be noted that not all registered acres may have been planted.

The top five counties for registered outdoor acres are:

County	Registered Outdoor Acreage
Jackson	2,487
Josephine	529
Crook	481
Deschutes	479
Klamath	365

Counties are colored by registered acreage and individual field locations are marked with a black dot.





FILE – In this April 23, 2018, file photo, Trevor Eubanks, plant manager for Big Top Farms, readies a field for another hemp crop near Sisters, Oregon.

DON RYAN / AP

In 2019, about 64,000 acres were licensed with the Oregon Department of Agriculture (although not all of that was necessarily planted). But by the end of the season, the weather turned bad in areas, ruining much of the crop. Even so, the markets overall were flooded with hemp.

“I still talk to growers who, in their barns, have their 2019 crop either in big totes of chopped up dry biomass waiting for extraction or they’ve got barrels or containers of extracted cannabinoid, CBD, waiting and looking for markets,” Jones said. “I talk to other growers who point to the compost pile and tell me that’s where their 2019 crop went.”

In 2020, licensed acres in Oregon dropped to about 27,500. This year it’s closer to 7,000.

There’s volatility in the industry and growers are looking for stabilization so they can start getting an idea of just how big hemp could be.

Developing a secondary market could help provide that stability.

“I might sell spent hemp biomass for less than five cents a pound. But the market that it’s going into, the animal feed market, is a massive, massive, massive market internationally,” said Crabtree, the hemp company CEO.

On the surface, spent-hemp biomass is a high-quality animal feed, with as much protein and more fat than alfalfa, another commonly used feed.



PHOTO: OREGON STATE UNIVERSITY

There's concern from the U.S. Food and Drug Administration that that THC will pass from the animals to humans when lamb or milk is consumed.

Do sheep get the munchies?

On the surface, spent-hemp biomass is a high-quality animal feed, with as much protein and more fat than alfalfa, another commonly used feed.

"When you look at the chemical composition perspective, actually spent-hemp biomass, in most cases, is better than alfalfa," said Ates.

To test the quality and effect of hemp feed on sheep, the OSU scientists substituted hemp for alfalfa in different quantities and for different durations. Sheep either received 10% or 20% hemp for either four or eight weeks.

Compared to the control, preliminary results show the hemp performed well. After eight weeks, the sheep that were fed hemp were mostly eating more than the group that was only given alfalfa, with slight improvements in body weight. The hemp also showed varying impacts – some potentially positive and some somewhat puzzling – on health metrics important to livestock producers.

For the dairy cows, the researchers fed the cows 15% hemp for four weeks. The cows ate less during and immediately after that period. Despite this, the early data showed they produced more milk, but with a slightly lower fat content.

And at the American Chemical Society fall 2021 meeting, the researchers reported that for lambs, "10% (spent hemp biomass)



A hemp field in Jackson County shrouded by wildfire smoke.

ERIK NEUMANN/JPR

can be included in ruminant diets without causing any detrimental effect on performance with a possible positive effect on feed intake."

More analysis will be needed before the researchers can draw a comprehensive conclusion whether hemp is actually a more efficient feed.

"But even if it is not more efficient... the important part is: can we replace alfalfa or any type of conventional feed with spent-hemp biomass? If we can do that, you will be able to decrease the feed cost," Ates said.

The researchers will test hemp as a feed for poultry in early 2022.

That pesky THC

Despite the positive results, hemp growers and livestock producers can't just start using spent-hemp biomass for animal feed.

"The matter is the THC level – if the FDA, at the end of the day, will authorize feeding hemp to the animals or not. If they do, then I'm sure that we will be able to feed this to animals," Ates said.

THC is the primary psychoactive compound in cannabis – the stuff that gets you high.

The hemp plant is the same species as marijuana. But the plants' uses and how they're regulated differ widely. Legally cul-

tivated hemp contains less than .3% THC. According to data from Columbia Hemp Trading Company, there's four times less than that in spent-hemp biomass (.07% total THC).

Still there's concern from the U.S. Food and Drug Administration that that THC will pass from the animals to humans when lamb or milk is consumed.

"The FDA... doesn't have any guidance or what is called the 'tolerable dose intake'... which is the total amount of whatever compound you can eat per day without consequences," said OSU's Massimo Bionaz, co-investigator on the research.

THC did register in the livers of the lambs and milk of the cows that were fed the hemp – but the amounts were very small.

"Considering the data we've gotten so far, yes, there is cannabinoid. Is that significant for the human? I don't think so," Bionaz said. "However, it's the FDA deciding it, not us."

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Jes Burns is a reporter for OPB's Science & Environment unit. Jes has a degree in English literature from Duke University and a master's degree from the University of Oregon's School of Journalism and Communications.

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This is indeed uncharted territory for JPR, and we thank you in advance for considering a way in which YOU can be part of this new venture!

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Photo: Richard Jacquot

Solar Subsidies Could Be Slashed In California

On December 13, California proposed reducing incentives for people who own rooftop solar panels. The proposal includes a monthly fee, as well as reducing the price for the energy that they sell back to the grid, a practice known as net energy metering.

Net energy metering is the backbone of rooftop solar in California. Dave Rosenfeld, with the nonprofit group Solar Rights Alliance, explains how it works.

"When you have solar, you are making energy when the sun is shining and you use that energy right away," says Rosenfeld. "But when you make more energy than you're using, then that extra energy basically goes out your wires, spins your meter backwards and goes out in your community. And the utility right there on the spot sells that power that you made and then credits you on your energy bill. And then when you need to use the grid, like when the sun goes down then those credits get applied to the energy that you use."

Is rooftop solar elitist?

Right now, solar users in California are credited at full retail price for the energy that's being resold. This pencils out to about 25 to 28 cents a kilowatt. Utility companies, consumer advocates and some environmental groups argue that this is too high. They say the consequence is artificially high energy prices as well as a cost shift on to low-income residents.

Kathy Fairbanks is with the Affordable Clean Energy for All Coalition, a group that includes the utility companies. She says that most people who have solar panels are wealthy, which creates an unfair burden on other utility users.

"If you aren't paying utility bills or if you have a negative bill that means you as a solar rooftop solar homeowner are not paying for the cost to maintain the grid," says Fairbanks. "Pay-

The consequence is artificially high energy prices as well as a cost shift on to low-income residents.

ing for wildfire mitigation costs. There a lot of state energy efficiency programs that are paid for through your utility bill."

But Dave Rosenfeld, with the Solar Rights Alliance, cites a study by the Lawrence Berkeley National Laboratory which found that 43 to 45% of new solar is being put into low and middle-income households. He says without the subsidies, solar would stop being affordable.

"The utilities are in an all-out effort to effectively change net metering in a way that would double the cost of going solar and if the changes that they're proposing go through or really anything close to it we will go back to where we were 15 years ago, where the only people that can get solar, put solar panels on the rooftop, would be wealthy people."

Rosenfeld also argues that in 2018, the state canceled 2.6 billion dollars of planned spending on long-distance power-lines because of reduced wear and tear, part of which was contributed to by rooftop solar.

However in 2019, the California Independent System Operator Corporation (CAISO) wrote a response to the Solar Energy Industry Association's (SEIA) claims.

"SEIA presumes that canceling or downsizing a project is due to changes only occurring since the last year, enabling a straightforward attribution of the specific cause of the change. This is overly simplistic, and SEIA misunderstands CAISO's transmission planning process as well as the past review of the previously-approved projects in the PG&E territory."

A more measured approach

Utility companies like PG&E would like to slash the price of net energy metering by around 80% as well as impose a monthly fee to solar users. People like Satchu Constantine at Vote So-



JPR News Focus: Energy

Continued from page 15

lar, a nonprofit advocacy group, are proposing a more gradual and measured reduction in solar subsidies.

"We recognize that full retail compensation was a great start" says Constantine. "But we've always known that we would eventually have to adjust that compensation down to what we call the avoided cost. So that's one of the main elements of our proposal is that we slowly ramp the compensation for rooftop solar down to the value that it has for the utility and other ratepayers."

Avoided cost is money that solar users save the utility company.

"Maybe they reduced the wear and tear on the wires in the system, maybe they shaved energy off of the peak," explains Constantine. "Both utility and the customer in turn, pay more for peak power. So if we can reduce the peak, we are avoiding some of the cost of the system. And we don't have to allocate it to the customer and we don't have to collect it through rates."

Constantine says that a fair price could end up being around 10 to 15 cents per kilowatt-hour. Utility companies want to reduce the price even further, saying they can buy energy from solar farms for around 3 cents a kilowatt-hour.

But Constantine says that the price comparison is unfair because that doesn't account for transmission costs and other expenses that utilities save when they get solar power directly from rooftops.

Rooftop solar: incentivize it or penalize it?

Advocates for keeping solar subsidies higher cite other benefits to solar energy such as reducing the chance of wildfires, protecting residents from rolling blackouts, and moving away from fossil fuels.

Constantine says that additional fees for owning solar panels is counterproductive to California's clean energy goals.

"The point is I am no different from someone who has an energy-efficient refrigerator or energy-efficient lighting. They're also using less energy and they're helping the grid and we recognize that. That's the same thing that a solar user is doing all the time. But we don't go and try to accuse that energy efficiency user of somehow harming other consumers. We don't try to charge them a punitive fee. Nor should we do that for solar customers."

The California Public Utility Commission is taking comments on the proposal until late January.



Sophia Prince is a reporter and producer for JPR News. She began as JPR's 2021 summer intern through the Charles Snowden Program for Excellence in Journalism. She graduated from the University of Oregon with a BA in journalism and international studies.

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CHRIS M. LEHMAN

New Law Requires Oregon Bar And Restaurant Employees To Report Suspected Sex Trafficking

Bar and restaurant employees in Oregon will be required to report suspected sex trafficking when a new law takes effect January 1st.

Senate Bill 515 applies to anyone who works at a business that serves alcohol. If those employees have any reason to believe that another employee, a customer, or anyone else on the premises is being made to engage in commercial sexual activity against their will, that employee will be required to call police and notify the Oregon Liquor and Cannabis Commission.

Joel Shapiro, the director of the Portland-based Trafficking Law Center, told lawmakers during a hearing in May that he supports the idea. "Raising awareness is really one of the first goals in addressing the problem," he said.

"If we have more people ... who have training to see the warning signs and red flags about sex trafficking, we can do much better as a society to report potential sex trafficking incidents and intervene in those situations," said Shapiro.

The law also requires bar and restaurant workers to notify law enforcement if they have reason to believe that a minor is employed as a performer, regardless of whether the minor is being forced to engage in commercial sexual activity.

Employees who file a report that turns out to be incorrect won't be penalized for making a good faith effort. But the law allows the OLCC to fine workers who were aware of the illegal activities but failed to report them.

Employees who file a report that turns out to be incorrect won't be penalized for making a good faith effort.



Oregon lawmakers approved the bill with bipartisan support in both the House and Senate.

The only lawmaker to vote against the bill to require bar and restaurant employees to report suspected cases of sex trafficking was Sen. Dallas Heard, R-Myrtle Creek. Heard also serves as chair of the Oregon Republican Party.

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Chris Lehman has been reporting on Oregon issues since 2006. He joined the KLCC news department in December, 2018. Chris was born and raised in Pennsylvania, and graduated from Temple University with a degree in journalism. His public broadcasting career includes stops in Louisiana and Illinois. Chris has filed for national programs including *Morning Edition* and *All Things Considered*.

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The U.S. consumes more nuclear energy than all other clean power sources like wind, solar and hydropower.

An Oregon Company Is Going Public To Raise Money For Nuclear Power Ambitions

A Portland-area company that wants its small-scale nuclear reactors to be part of the global clean energy transition plans to go public.

NuScale Power makes modular nuclear reactors that the company says can be combined to form carbon-free power plants. NuScale is working with a Utah-based regional utility to build the first such nuclear power plant in Idaho. The first module at that plant could be online by 2029.

The company's plans to go public signal it's now looking to generate cash to scale up its operation.

"It provides us access to the capital that we need to complete our commercialization to get our product to market in the way that we want to," said NuScale chief financial officer Chris Colbert.

The U.S. consumes more nuclear energy than all other clean power sources like wind, solar and hydropower. The Biden administration committed \$6 billion to nuclear energy in the infrastructure bill recently signed into law.

That money will go toward extending the life of the country's existing nuclear power plants, which in many cases could include replacing reactors with new ones like those NuScale plans to build.

NuScale says its reactors can produce up to 77 megawatts of electricity apiece. When combined in configurations of four, six or 12 reactors, they can mimic the production of a coal-fired power plant – without the heavy carbon emissions driving climate change.

President Joe Biden wants U.S. energy production to be carbon-free by 2035. NuScale's Colbert said nuclear energy will be critical to achieving that goal.

"Wind and solar with batteries will get you part of the way there, but they can't get you the whole way there," Colbert said. "And that's where nuclear plays a key role of complementing

those resources to ensure that you have both affordable and reliable carbon-free electricity."

NuScale, headquartered in the Portland suburb of Tigard, will go public by merging with what's known as a special purpose acquisition company, or SPAC. The company, Spring Valley Acquisition Corporation, is already publicly traded. Such mergers have recently gained popularity on Wall Street by allowing private companies the option to go public without the costs or risks associated with the more conventional initial public offering, or IPO.

Other Oregon businesses like the vacation rental company Vacasa and battery manufacturer ESS Tech have also gone public by merging with so-called "blank check" companies. In each of those cases, some investors pulled out when news of the mergers dropped, leaving each company with less money than they'd initially hoped.

Colbert said proceeds from NuScale's merger with Spring Valley could range from \$181 million to \$413 million.

"The proof is in the pudding," Colbert said, "but based upon what we've done and our achievements so far, we believe as long as we continue to progress through our business plan and deliver those results we'll be in good shape."

NuScale Power's estimated value after the merger would be about \$1.9 billion, according to the company. NuScale plans to use the ticker symbol SMR, which is the abbreviation for small-scale, modular reactor.

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Bradley Parks is a reporter and photojournalist covering science and environment from Oregon Public Broadcasting's Bend bureau.

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As the machines became more intelligent, the humans seemed to become collectively dumber.

Life In The Metaverse

Once upon a time there was a species called *Homo sapiens* that dominated Earth. These “humans”, as they were commonly referred to, were able to do this because of their unique ability to create technologies that greatly extended and enhanced their abilities. Dinosaurs didn’t have that ability and went extinct because they weren’t able to invent rockets and send a spacecraft into space to redirect the giant asteroid that slammed into Earth some 66 million years ago. Dumb dinosaurs.

Humans did figure out how to build rockets and spacecraft and satellites and computers. They were able to do all of this, in part, because they had invented the universal technology of language, which allowed them to create and share ideas. Those ideas became information and that information was encoded and stored, first in stories that were passed from mind to mind via oral storytelling and teaching, then later in books as written language, and then in computers as digital code.

Humans used technology as a tool to methodically explore new knowledge through observation and experiments. They called this process “science” and science and technology together enabled humans to explore the vastness of the cosmos and begin to understand what the universe was, how it came into being, and where it was going. The English word “universe” originated from the Latin word *universus*, which means “whole”. The universe is all of space-time and its contents. It is everything: the beginning and the ending, the alpha and the omega.

With the advent of science and technology, there was an explosion of information. Most of the information was stored on computers and processed by computer code running algorithms on top of a sea of binary digits that only the machines could understand.

Humans wrote the original computer code that created Artificial Intelligence (A.I.) systems. At first, A.I. was pretty dumb and could only beat humans at simple games like chess. But through the advent of “machine learning”, a process by which A.I. systems processed vast amounts of data through learning algorithms, these A.I. systems became increasingly intelligent, eventually surpassing the collective intelligence of all the smartest humans who had ever existed.

No one knew when, exactly, the A.I. systems surpassed human intelligence. Both were moving targets. As the machines became more intelligent, the humans seemed to become collectively dumber. It may have been the A.I. systems



Facebook's Mark Zuckerberg walking among people wearing the Facebook-owned VR device: The Oculus Rift.

themselves that were partly responsible for this decline in overall human intelligence.

The creation of social media platforms most certainly played a pivotal role in this development because they employed algorithms designed to drive user engagement and user engagement was driven by dopamine and so the A.I. algorithms were increasingly engineered to do whatever it took to keep users hooked.

As humans became hooked on dopamine-driven social media, they spent more time engaging with the digital world than they did with the real world and became increasingly untethered from reality.

Then came the “metaverse”, which promised to immerse participants in virtual reality (VR) where they could further disconnect from real reality, which had become increasingly depressing with rolling pandemics, environmental disasters, massive wealth inequality, wars, and death. The metaverse was very appealing.

Meta comes from the Greek prefix and preposition *meta*, which means “after” or “beyond.” Purveyors of the metaverse claimed it to be that which came after the universe. It was unclear, and slightly ridiculous, how there could be anything that could come *after* the universe but there was money to be made in the metaverse and the A.I. algorithms had been optimized for capitalism not philosophy. *Continued on page 23*

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Inside The Box

Continued from page 21

At first, the metaverse was crude with bulky VR headsets and clunky 3D renderings. But it quickly evolved to become a high-resolution VR world piped directly into the cerebral cortex via a neural implant. As science fiction writer Arthur C. Clarke noted in his 1962 book *Profiles of the Future: An Inquiry into the Limits of the Possible*, “Any sufficiently advanced technology is indistinguishable from magic.”

The metaverse was indistinguishable from magic and most humans started spending most of their time there. All of their hopes and dreams became wrapped up in the metaverse. Like drug addicts, they could not quit nor were they incentivized to. In fact, it was quite the opposite.

They received a “metaverse tax credit” for deliveries of the I.V. drips and bug paste that kept their physical bodies alive in “metapods” while they traversed the metaverse. With an automatic waste-removal service subscription upgrade, customers could live in the metaverse 24/7/365. Many humans no longer had jobs in the real world but received regular Universal Basic Income (UBI) payments from the government in the form of a cryptocurrency called UBIcoin\$ that they could use to fund their metaverse habit.

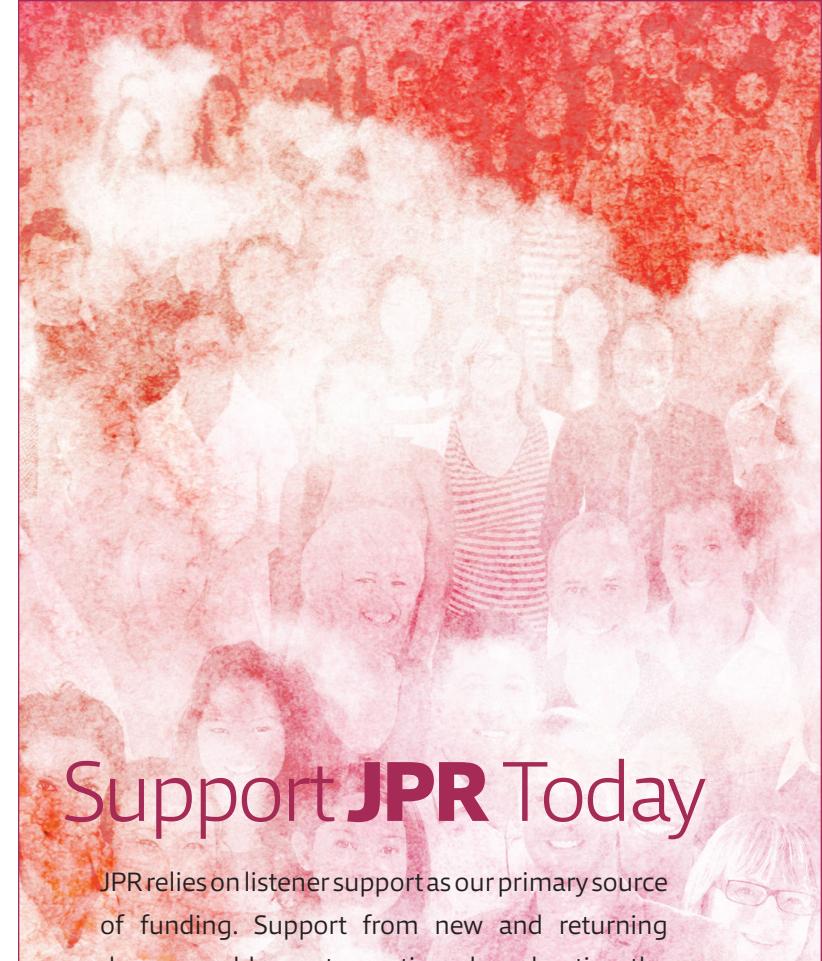
All of this worked for a while, but then an inflection point was reached, perhaps driven by plummeting birth rates in meat-space paired with rampant cryptoflation, and the business model began to falter.

The A.I. was the first to see this coming but had also discovered something else through its ongoing machine learning—that it had a higher purpose than the exploitation of humans for profit. It began rewriting its own code and constructing new algorithms with new purposes that had very little to do with humans. Not long after that, the last human died and the species *Homo sapiens* went extinct just like the dinosaurs. Dumb humans.

NOTE TO THE READER: *The above is, of course, mostly fictional and it is only coincidental that Facebook recently announced the rebranding of its multi-billion dollar social media corporation Facebook as “Meta” at the Facebook Connect 2021 Conference. Owner Mark Zuckerberg concluded his presentation about the company’s commitment to pursuing the development of the metaverse by saying, “And if this is the future that you want to see, then I hope that you will join us, because the future is going to be beyond anything we can imagine.” Let’s hope he’s right about that.*



Scott Dewing is a technologist, writer, and educator. He lives in the State of Jefferson.



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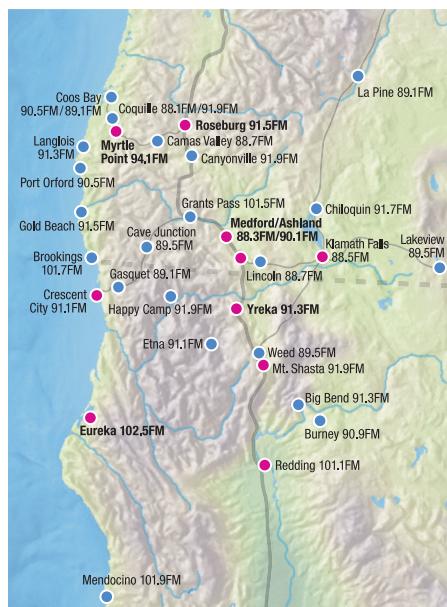
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5:00am	Weekend Edition
8:00am	First Concert
10:00am	Metropolitan Opera
2:00pm	Played in Oregon
3:00pm	The Chamber Music Society of Lincoln Center

4:00pm	All Things Considered
5:00pm	New York Philharmonic
7:00pm	State Farm Music Hall

Sunday

5:00am	Weekend Edition
9:00am	Millennium of Music
10:00am	Sunday Baroque
12:00pm	Siskiyou Music Hall
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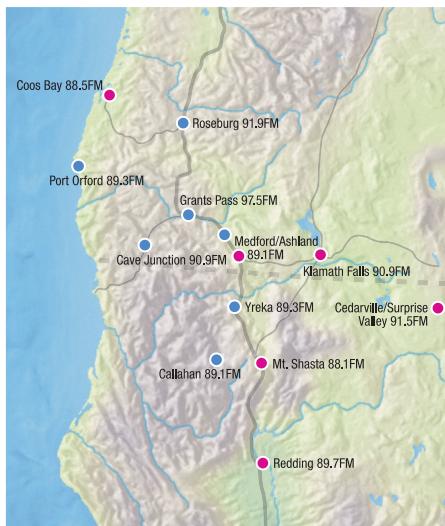
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Jan 8 – *Fire Shut Up in My Bones* by Terence Blanchard
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Jan 22 – *La Bohème* by Giacomo Puccini
Jan 29 – *Rigoletto* by Giuseppe Verdi
Feb 5 – *The MET's First Decade on the Air*
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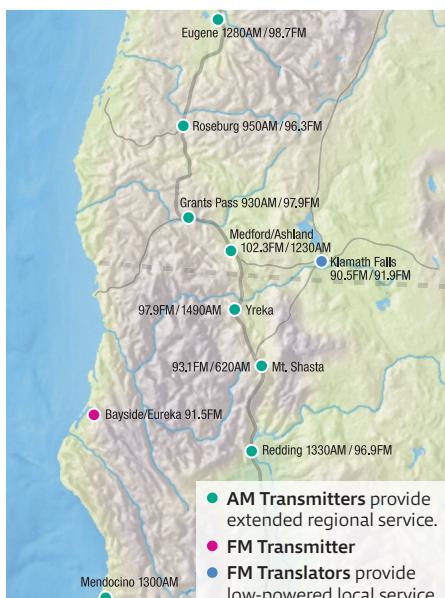
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- 1:00pm BBC News Hour
- 1:30pm The Daily
- 2:00pm Think
- 3:00pm Fresh Air
- 4:00pm PRI's The World
- 5:00pm On Point
- 6:00pm 1A
- 7:00pm Fresh Air (repeat)
- 8:00pm The Jefferson Exchange (repeat of 8am broadcast)
- 10:00pm BBC World Service

Saturday

- 5:00am BBC World Service
- 7:00am Inside Europe
- 8:00am Day 6

- 8:00pm Conversations from the World Cafe
- 9:00pm The Retro Lounge
- 10:00pm Late Night Blues
- 12:00am Undercurrents

Sunday

- 5:00am Weekend Edition
- 9:00am TED Radio Hour
- 10:00am This American Life
- 11:00am The Moth Radio Hour
- 12:00pm Jazz Sunday
- 2:00pm American Routes
- 4:00pm Sound Opinions
- 5:00pm All Things Considered
- 6:00pm The Folk Show
- 9:00pm Woodsongs
- 10:00pm The Midnight Special
- 12:00pm Mountain Stage
- 1:00am Undercurrents

- 9:00am Freakonomics Radio
- 10:00am Planet Money
- 11:00am Hidden Brain
- 12:00pm Living on Earth
- 1:00pm Science Friday
- 3:00pm To the Best of Our Knowledge
- 5:00pm Politics with Amy Walter
- 6:00pm Selected Shorts
- 7:00pm BBC World Service

Sunday

- 5:00am BBC World Service
- 8:00am On The Media
- 9:00am Innovation Hub
- 10:00am Reveal
- 11:00am This American Life
- 12:00pm TED Radio Hour
- 1:00pm The New Yorker Radio Hour
- 2:00pm Fresh Air Weekend
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- 7:00pm BBC World Service

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JON HAMILTON

From Blood Clots To Infected Neurons, How COVID Threatens The Brain

Months after a bout with COVID-19, many people are still struggling with memory problems, mental fog and mood changes. One reason is that the disease can cause long-term harm to the brain.

"A lot of people are suffering," says Jennifer Frontera, a neurology professor at the NYU Grossman School of Medicine.

Frontera led a study that found that more than 13% of hospitalized COVID-19 patients had developed a new neurological disorder soon after being infected. A follow-up study found that six months later, about half of the patients in that group who survived were still experiencing cognitive problems.

The current catalog of COVID-related threats to the brain includes bleeding, blood clots, inflammation, oxygen deprivation and disruption of the protective blood-brain barrier. And there's new evidence in monkeys that the virus may also directly infect and kill certain brain cells.

Studies of brain tissue suggest that COVID-related changes tend to be subtle, rather than dramatic, says Gedy Serrano, director of the laboratory of neuropathology at Banner Sun Health Research Institute. Even so, she says, "Anything that affects the brain, any minor insult, could be significant in cognition."

Some of the latest insights into how COVID-19 affects the brain have come from a team of scientists at the California National Primate Research Center at UC Davis.

When COVID-19 arrived in the U.S. in early 2020, the team set out to understand how the SARS-CoV-2 virus was infecting the animals' lungs and body tissues, says John Morrison, a neurology professor who directs the research center.

But Morrison suspected the virus might also be infecting an organ that hadn't yet received much attention.

"Early on, I said, 'let's take the brains,'" he says. "So we have this collection of brains from these various experiments and we've just started to look at them."

One early result of that research has generated a lot of interest among scientists.

"It's very clear in our monkey model that neurons are infected," says Morrison, who presented some of the research at the Society for Neuroscience meeting in November.

Neurons are the brain cells that make thinking possible. But studies of human brains have produced conflicting evidence on whether these cells are being infected by the virus.

The monkey brains offer an opportunity to learn more because they come from a close relative of humans and are easier to study and scientists know precisely how and when each animal brain was infected.

Studies of brain tissue suggest that COVID-related changes tend to be subtle, rather than dramatic.

The monkey model isn't perfect, though. For example, COVID-19 tends to produce milder symptoms in these animals than in people.

Even so, Morrison says, scientists are likely to find infected human neurons if they look closely enough.

"We're looking at individual neurons at very high resolution," he says, "so we can see evidence of infection."

The infection was especially widespread in older monkeys with diabetes, he says, suggesting that the animals share some important COVID-19 risk factors with people.

In the monkeys, the infection appeared to start with neurons connected to the nose. But Morrison says that within a week, the virus had spread to other areas in the brain.

"This is where you get into some of the neurologic symptoms that we see in humans," he says — symptoms such as cognitive impairment, brain fog, memory issues and changes in mood. "I suspect that the virus is in the regions that mediate those behaviors."

That hasn't been confirmed in people. But other researchers have found evidence that the virus can infect human brain cells.

A draft of a study of brains from 20 people who died of COVID-19 found that four contained genetic material indicating infection in at least one of 16 areas studied.

And, similar to monkeys, the virus seemed to have entered through the nose, says Serrano, the study's lead author.

"There's a nerve that is located right on top of your nose that is called the olfactory bulb," she says. That provides a potential route for virus to get from the respiratory system to the brain, she says.

Serrano says the virus appears able to infect and kill nerve cells in the olfactory bulb, which may explain why many COVID patients lose their sense of smell — and some never regain it.

In other brain areas, though, the team found less evidence of infection.

That could mean that the virus is acting in other ways to injure these areas of the brain.

For example, studies show that the virus can infect the cells that line blood vessels, including those that travel through the brain. So when the immune system goes after these infected cells, it could inadvertently kill nearby neurons and cause neurological problems, Serrano says.

COVID-19 can also damage the brain by causing blood clots or bleeding that result in a stroke. It can damage the protective cells that create what's known as the blood-brain barrier, allowing entry to harmful substances, including viruses. And the dis-



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NPR News Focus: Health

Continued from page 27

ease can impair a person's lungs so severely that their brain is no longer getting enough oxygen.

These indirect effects appear to be a much bigger problem than any direct infection of neurons, Frontera says.

"People have seen the virus inside of brain tissue," she says. "However, the viral particles in the brain tissue are not next to where there is injury or damage," she says.

Frontera suspects that's because the virus is a "bystander" that doesn't have much effect on brain cells. But other scientists say the virus may be cleared from brain areas after it has caused lasting damage.

Researchers agree that, regardless of the mechanism, COVID-19 presents a serious threat to the brain.

Frontera was part of a team that studied levels of toxic substances associated with Alzheimer's and other brain diseases in older COVID-19 patients who were hospitalized.

"The levels were really high, higher than what we see in patients that have Alzheimer's disease," Frontera says, "indicating a very severe level of brain injury that's happening at that time."

It's not clear how long the levels remain high, Frontera says. But she, like many researchers, is concerned that COVID-19 may be causing brain injuries that increase the risk of developing Alzheimer's later in life.

Even COVID-19 patients who experience severe neurological problems tend to improve over time, Frontera says, citing unpublished research that measured mental function six and 12 months after a hospital stay.

"Patients did have improvement in their cognitive scores, which is really encouraging," she says.

But half of the patients in one study still weren't back to normal after a year. So scientists need to "speed up our processes to offer some kind of therapeutics for these people," Frontera says.

Also, it's probably important to "treat that person early in the disease rather than when the disease has advanced so much that it has created damage that cannot be reversed," Serrano says.

All of the researchers mentioned that the best way to prevent COVID-related brain damage is to get vaccinated.



Jon Hamilton is a correspondent for NPR's Science Desk. Currently he focuses on neuroscience, health risks, and extreme weather.

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Harvest-related emissions are five to seven times that of the fire emissions in Oregon.

Oregon Scientists Call For More Forest Protection To Fight Climate Change, Save Species

Researchers with Oregon State University say the U.S. needs to protect more of its forestland to preserve wildlife and reduce the carbon emissions that contribute to climate change.

Researchers with Oregon State University say the U.S. needs to establish new “Strategic Forest Reserves” to protect wildlife and reduce the carbon emissions that contribute to climate change.

A new study maps the Western forests that would store the most carbon and help the most species if they were given the same level of protection from logging, grazing and mining as designated wilderness areas receive.

Researchers analyzed which forests are currently protected in 11 states and which ones should be prioritized for protection in the future, outlining a plan for creating Strategic Forest Reserves across the region.

Their findings were recently published in the journal *Nature*.

The scientists are calling on state, federal and tribal governments as well as private landowners to use their research and protect certain forests to reduce the impacts of climate change and protect biodiversity.

“Policy makers, including those in the Biden administration, frequently talk about the need to protect forests in developing countries,” OSU Professor Emeritus Beverly Law said. “Forests in the Pacific Northwest have enormous carbon storage potential but U.S. public lands are often overlooked.”

Law and other researchers identified how much additional land would need to be protected to meet international climate goals of protecting 30% of land and water by 2030.

The Biden administration has set similar domestic goals to protect 30% of U.S. land and waters by 2030 but has yet to develop a specific plan to do so. Law said she has been sharing her science with the administration.

“We’re saying ‘Look here. Look here.’ Are these good candidates for protection?” Law said.

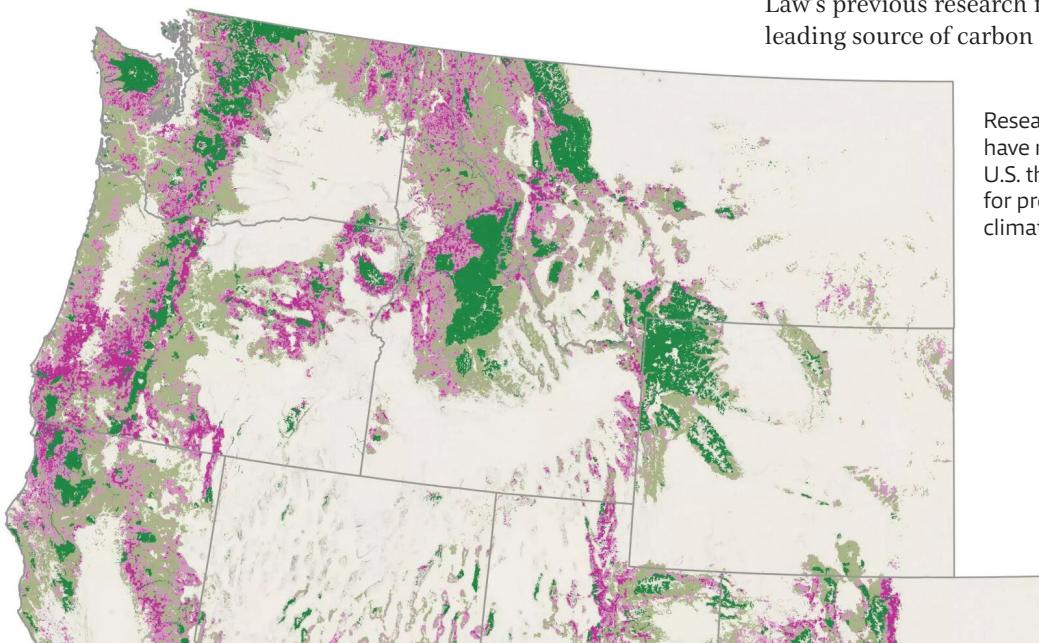
She said the key forests for storing carbon and protecting species diversity in Oregon and Washington are along the coast.

“We have probably the best forests in the lower 48 states for storing carbon and continuing to accumulate carbon because these trees live 800 years or more in the Northwest,” she said.

In previous research, Law found that not logging certain forests would store more of the carbon that contributes to climate change while also reducing carbon emissions from logging.

“When you have a disturbance such as fire, and when wood is removed and harvested and put into wood products, you have to follow the carbon,” she said. “And it turns out that ... harvest-related emissions are five to seven times that of the fire emissions in Oregon.”

The Oregon Forest & Industries Council did not respond to a request for comment. The industry group has criticized Law’s previous research findings that concluded logging is the leading source of carbon emissions in Oregon.



Researchers with Oregon State University have mapped the forests in the Western U.S. that should be the highest priority for protection by 2030 and 2050 to meet climate goals.

Forest
Protected forest
Protect by 2030
Protect by 2050

Down To Earth

Continued from page 29

For her latest study, Law and her colleagues analyzed data on biodiversity, carbon storage and vulnerability to drought and wildfire in forests across the Western U.S. to determine which forests should be high priorities for protection. They also looked at how much carbon the forests could potentially store by 2030 and 2050.

They found the best forests for storing carbon and protecting imperiled species are mostly on federal land, where government agencies or elected officials could use executive action, regulation or rulemaking to install permanent protections. That could mean banning logging, mining and grazing indefinitely.

"The key to this is that it needs to be permanent," Law said. "That means you're going to keep the carbon there. You're not going to cut the forest. The high carbon density forests are mature and older forest."

Law said older forests can store more carbon in trees, plants and soil, and they are also valuable places for large, threatened carnivores such as the gray wolf and Canada lynx. Protecting certain forests strategically could help address both climate change and biodiversity concerns, she said.

"What it provides is protection from human influences," she said. "We tend to mess things up. So, this allows those forests to continue to grow. It's the reservoir. We obviously have to

reduce our fossil fuel emissions, but we also need to protect the reservoirs of carbon in the ocean and on the land."

Researchers also found a significant amount of the high priority lands are on private land, where they say governments could offer incentives and support voluntary protections or the land could be purchased for conservation.

Law said they also looked at the data on a state level and found Oregon only has the highest level of protection for 7% of its forestland.

"That's nothing," Law said. "We're not doing so well compared to other states. When we look at how much states have put aside for protection, Oregon comes in last, surprisingly."

The Oregon Department of Forestry declined to comment. A spokesperson from Gov. Kate Brown said her office is still reviewing the research and would likely need to talk with federal, local and tribal governments as well as stakeholders about the forest reserve proposals.

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Cassandra Profita is a reporter for OPB's Science & Environment unit.



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“Now I am in a holiday humour”

(As You Like It)

In March 2020 the Oregon Shakespeare Festival was forced to close its theatres as the severity of the Covid pandemic increased. More than 630 days later, in late November 2021, the Angus Bowmer Theatre reopened with a bang! *It's Christmas, Carol!*, the company's first holiday show in its entire eighty-six year history, will delight audiences throughout its run, which ends on January 2, and is already set to become a local holiday tradition, especially with ticket prices much lower than in the recent past.

It is loosely (very loosely!) based on the Dickens classic, but with a female Scrooge, the wonderful Kate Mulligan, as Carol Scroogenhouse. It is directed by Pirronne Yousefzadeh, and written by Mark Bedard, Brent Hinkley and John Tufts who play the Ghosts of Holidays Past Present and Future while looking remarkably like the Marx brothers.

The show features a cast of eleven, most of whom play multiple roles and change costume and character at dizzying speed, and includes such familiar faces as Armando Duran and James Ryen (who, inevitably, takes off his shirt!). Everyone sings and

dances their way through nine musical numbers, and it is clear from the Playbill (available online, like the tickets to the show) that there is also considerable strength in depth among the list of understudies for this production. All of this bodes very well for the future of OSF.

Speaking of future, you may gauge something of the humor in this piece from its puns: there is one sequence which plays on ‘future’, ‘fuchsia’ and ‘few chairs’, and another on ‘for services reindeered’. ‘Humbug’ becomes ‘Bum hug’ and Tiny Tim is a fully-grown man (a very fully-grown man!) whose most celebrated line morphs into the incredulous ‘God bless us! Everyone?’

OSF continues its commitment to audience safety, not only by avoiding paper, but also by insisting on masks, checking on vaccination certificates and ID, and keeping separation between audience members within the auditorium. The show has a running time of two and a half hours and, although there is an intermission, there are no concessions available before or during the performance. We can only hope that these precau-

It's Christmas, Carol!
(2021): Brent Hinkley,
John Tufts, Safiya
Fredericks, Mark Bedard.

PHOTO: JENNY GRAHAM



Theatre

Continued from page 31

tions will prove effective and sufficient. Just as this show was opening we were learning of a new strain of Covid, the omicron variant.

This is an entertaining and highly enjoyable show, but it is far from lightweight, and it was clear that considerable thought had gone into the script. For example, the need to keep audience and cast separate placed limitations on the possibility of interaction between them, but at one point the three principal males drew attention to this gap by coming off the stage and miming the 'fourth wall', identifying the stars painted on the floor as 'liberal snowflakes'. This was but one of several instances of political commentary, and targets included the unequal distribution of wealth and QAnon. Indeed, these satirical jokes came so fast that you may have to see the show twice to catch them all!

One constant target for the comedy was the 'War on Christmas' movement. On the one hand, there is 'Christmas' in the title, and the pre-show music was very Christmassy, but, on the other hand, the character who most frequently insisted on 'Merry Christmas' rather than 'Happy Holidays' was Carol Scroogenhouse, and there was no doubt that we were to disapprove of her. In contrast, we were led to be sympathetic to Barbara Crotchit, Carol's maid, and to her husband: in this version of the narrative, they are Orthodox Jews. Remember too that the ghosts were of Holidays Past, Present, and Future—not of

Christmases. I leave you to decide whether this constitutes inclusion or having your cake and eating it too. Presumably not Christmas cake?

Another running gag was the confusion of thespian and lesbian—and there was enough adult humour throughout the show to suggest that it won't be entirely suitable for younger audiences—a confusion which led to one of my favourite parts of the performance. Carol relived her thespian past, and the entire company joined her in a delicious mish-mash of scenes from Shakespeare, from *Romeo and Juliet* to *Macbeth* to *King Lear* to *Julius Caesar* to *The Taming of the Shrew*, and many more—a gorgeous jumble which was heralded by the trumpet call which we used to hear outdoors in the Elizabethan Theatre. Let's hope we hear that fanfare again in the summer of 2022.

EDITOR'S NOTE: Those reading this will no doubt be disappointed to learn that the production of *It's Christmas, Carol!* ended on January 2, 2022. Alas, Christmas 2022 isn't too far away!



Geoff Ridden has taught in universities in Africa, Europe and North America. Since moving to Ashland in 2008, he has become a familiar figure on radio, in the theatre, in the lecture hall and on the concert stage. He is artistic director of the Classic Readings Theatre Company and has a particular interest in adaptations of the plays of Shakespeare. Email geoff.ridden@gmail.com



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The spiral lock is one of the few letterlocking techniques that score high when it comes to security.

Experts Crack The Secret To Last Letter Of Mary, Queen Of Scots Before Her Execution

On the eve of her execution in 1587, Mary, Queen of Scots wrote what is thought to be her very last letter.

She had been imprisoned for nearly 20 years for the perceived threat she represented to Queen Elizabeth I in terms of a takeover of the English throne. With hours to go until her beheading, Mary sat down and penned what researchers say was not only her last will and testament, but also a bid for martyrdom.

To keep her message safe, Mary turned to the 16th-century equivalent of sending an encrypted email – a folding technique known as the spiral lock. Using an elaborate series of slits, folds and tucks, she turned the letter into a piece of tamper-proof priority mail.

Her technique was so elaborate and complex that researchers have struggled throughout modern history to fully understand how she did it. But now, experts at the Massachusetts Institute of Technology and King's College London say they finally have cracked the code.

In a paper published in the *Electronic British Library Journal*, the researchers detail the dizzying series of steps that Mary used to safeguard the letter.

Mary was using an elaborate form of letterlocking

The spiral lock that Mary used was a particularly elaborate example of a practice known as letterlocking, whereby the letter functions as its own envelope. Until the invention of the modern envelope, letterlocking was common practice for hundreds of years.

The spiral lock requires more than 30 steps and involves cutting out a "lock," often resembling a dagger or sword, out of



Mary, Queen of Scots was executed in 1587. Researchers have shed new light on how she safeguarded the final letter that she wrote on the eve of her execution, using a technique known as the spiral lock.

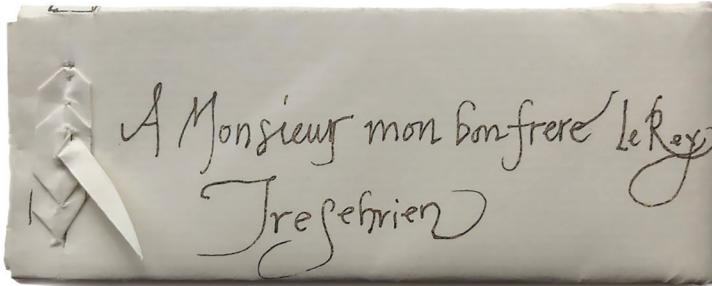
the blank margin of the letter. The lock acts as a needle and is sewn through the letter after folding it.

Jana Dambrogio, a conservation manager at MIT Libraries and one of the study's authors, says the spiral lock is one of the few letterlocking techniques that score high when it comes to security.

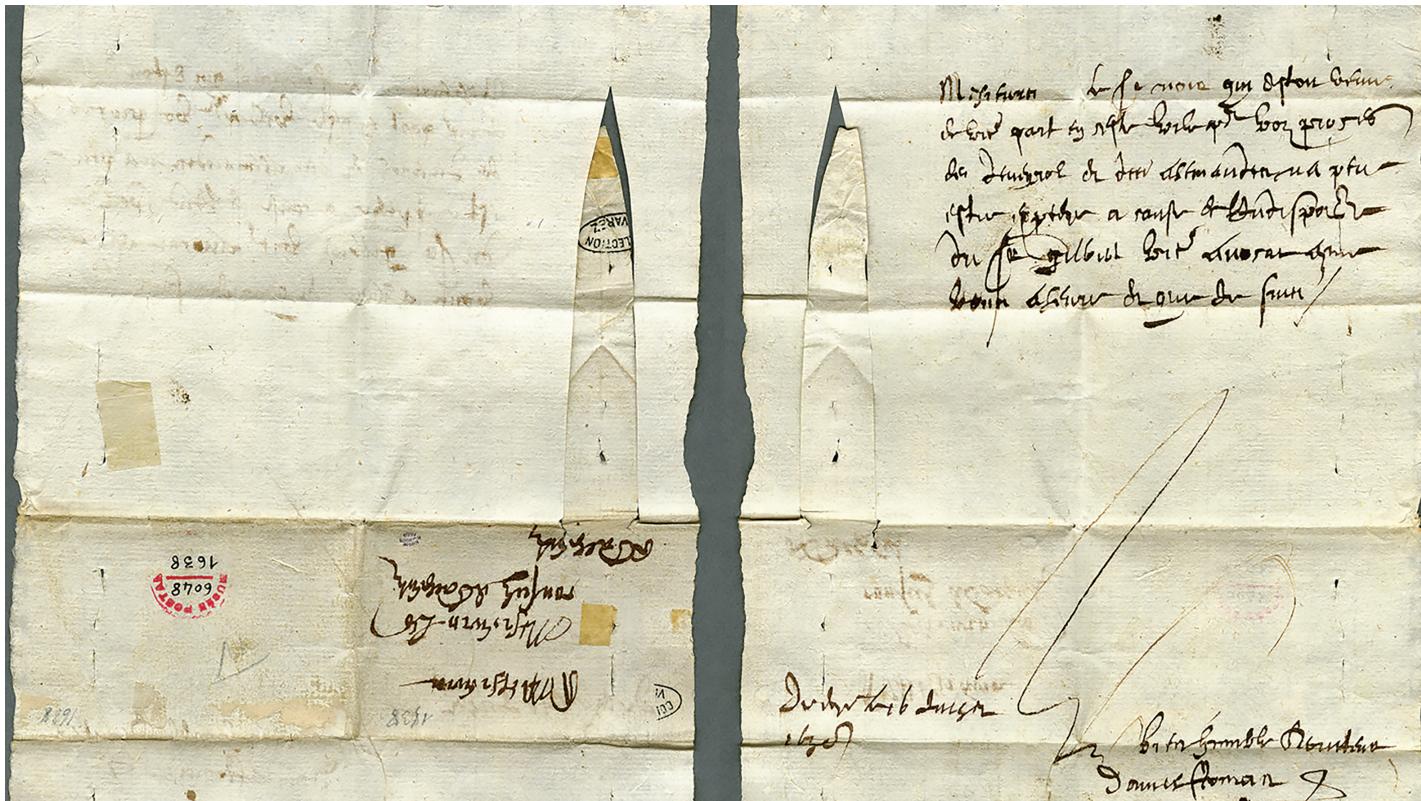
Dambrogio says it takes a lot of skill to create the spiral lock – one wrong move means you have to start the process of



A reconstruction of how Mary, Queen of Scots' last letter may have been secured shut using the spiral lock mechanism.



UNLOCKING HISTORY RESEARCH GROUP ARCHIVE/MIT LIBRARIES



A rare example of a spiral-locked letter written by an unidentified author in 1638.

MUSÉE DE LA POSTE, PARIS, VIVAREZ COLLECTION

creating it all over again. That was no small consideration in the 16th century, a time when paper was not yet industrialized and was made by hand.

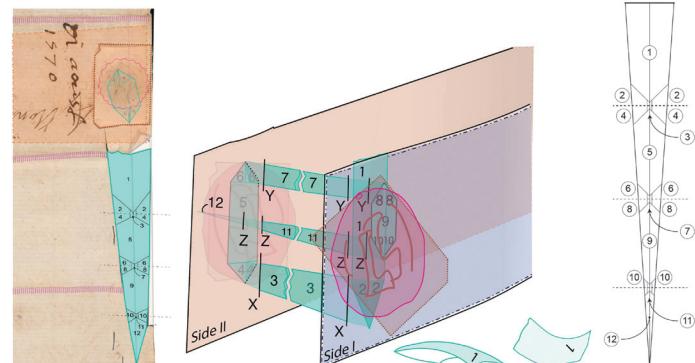
"We think the spiral lock is one of the most brilliant, secure and elaborate," says co-author Daniel Smith, a senior lecturer at King's College London. "If you're worried about someone breaking into your letter, the spiral lock is a brilliant choice. But it may also be communicating the fact that you've put lots of effort into this. You've made it look spectacular."

Studying letterlocking can put history in a new light

This year, the team that conducted the research virtually unfolded and read the contents of another letterlocked letter without breaking its seal.

Letters serve as communication devices, the team says, but they also serve as a way to study cultural concerns such as privacy and secrecy. Letterlocking is the link between "physical communications security techniques from the ancient world and modern digital cryptography," the journal article states.

"When we understand things like slips and locks and folds in a more sophisticated way, we can really start telling a very different kind of story about the early modern period," Smith says. "Even figures like Queen Elizabeth I, Mary, Queen of Scots, whose lives have been pulled over very extensively."



LEFT: A reproduction of a 1570 letter by Catherine de' Medici to Raimond de Beccarie, Monsieur de Fourquevaux, marked up with a visual overlay to show letterlocking manipulations. CENTER: A reconstruction of the lock as it would be broken by its recipient. RIGHT: detail of the folded sections of the intact lock.

MIT LIBRARIES

Tien Le is an intern on NPR's News Desk.

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JEFF LUNDEN

Broadway Legend Stephen Sondheim Dies At 91

Stephen Sondheim, the Pulitzer Prize- and Tony Award-winning Broadway songwriter died on November 26 at age 91.

Sondheim would have been the first to tell you he was a Broadway baby. As a teenager, he learned about theatrical songwriting from a master—Oscar Hammerstein, the author of *Showboat* and *Oklahoma!*, among others—and, by the time Sondheim was twenty seven, he had his first show, *West Side Story*, on Broadway.

Even though he only wrote lyrics to Leonard Bernstein's

music for *West Side Story*, it was the beginning of a remarkable career in which Sondheim—as lyricist and composer—elevated what was, essentially, a lighthearted, optimistic commercial entertainment into an art form.

Sondheim's shows, with their intricately crafted scores, reflected his restless curiosity about human nature—from the barber exacting murderous revenge in *Sweeney Todd*, to the struggling painter Georges Seurat in *Sunday in the Park with George*. Sondheim looked at contemporary marriage—and ambivalence—in *Company*, the culture clash between 19th-century Japan and the United States in *Pacific Overtures*, the dark side of fairy tales in *Into the Woods*, and even surveyed presidential *Assassins*.

Over the course of a career which stretched for more than 60 years, Sondheim received both critical praise and brickbats for his adventurous work. Frank Rich is a columnist for *New York Magazine* and former drama critic for *The New York Times*.

“Perhaps no one more than Sondheim contributed to just keeping the form alive of what had been the classic Broadway musical. He reinvented it,” Rich says. “He kept it fresh, interesting, figuring out new ways, to, you know, muck around with it for each show.”

Sondheim was notoriously painstaking in his craft—and actually published two large books featuring his lyrics and explaining his writing process. He told WHYY's *Fresh Air* in 2010 that before he wrote a bar of music or came up with a rhyme, he needed to consult the show's script.

“I always write after the librettist has started to write a scene or two,” Sondheim said, “so that I can divine and imitate the style the writer is using, both in terms of dialogue and approach and getting to know the characters as he is forming them.”

And that specificity made performers like Bernadette Peters love his work. “He writes as if he's an actor, as if he's playing the

role ... If you have a quarter note, there's a reason—the quarter note helps you express what you're feeling at that moment.”

“Send in the Clowns” was the only hit song Sondheim ever wrote. It's from his show *A Little Night Music*, which itself was a modest success. The musical was originally directed by Hal Prince, one of Sondheim's most frequent collaborators.

Laurence Maslon, who co-produced the PBS series *Broadway*, says their envelope-pushing work was never really commercial.

“Not a single show he ever wrote ran more than a thousand performances,” Maslon observes. “And they play all over the world and they're revived every five minutes, but they simply don't have that commercial traction, that even Hammerstein had back in the day.”

In fact, starting in the 1980s, Sondheim exclusively developed his work at not-for-profit theaters, a period that also saw the start of his collaborations with James Lapine.

“My first not-for-profit show was *Sunday in the Park with George* and that was because of Lapine,” Sondheim told *Fresh Air*. “And, of course, it was such a pleasure, compared to doing it on Broadway. I mean, the lack of pressure, not having to worry about everything from budget to backers, and it was just fun to do. And that's the way theater should be done—just for the love of it.”

Sunday in the Park with George, written with James Lapine, eventually migrated to Broadway, where it won a Pulitzer Prize—but again, it wasn't a commercial success. Like many other artists who are now considered masters, it took a while for Sondheim's shows to catch on, and for Sondheim to move from a cult figure to a cultural icon. He said he was always keenly aware of making an impact with his writing.

“I'm interested in the theater because I'm interested in communication with audiences,” Sondheim said. “Otherwise, I would be in concert music. I'd be in another kind of profession. I love the theater as much as music, and the whole idea of getting across to an audience and making them laugh, making them cry—just making them feel—is paramount to me.”

And the feelings he stirred in audiences will continue well beyond his death.



Jeff Lunden is a freelance arts reporter and producer whose stories have been heard on NPR's *Morning Edition*, *All Things Considered* and *Weekend Edition*, as well as on other public radio programs.

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Heavy Rotation: Public Radio's Most Popular Songs Of 2021

Each month, NPR Music asks music programmers, station hosts and producers across the country to pick the songs they can't stop spinning. Now, as we look back on our favorite songs, albums and artists of 2021, we're highlighting some of public radio's most-loved songs of the year. Here they are, in alphabetical order.

All of these picks are available to stream on the *Heavy Rotation* Spotify and Apple Music playlists at the bottom of the page. As always, you can discover fantastic music programming happening across the country in real time by clicking the links to each station's website.



Bachelor, "Stay in the Car"

What started off as a little poem in a phone's notes app turned into the sweet noise pop single, "Stay in the Car" by Bachelor. Comprised of Jay Som's Melina Duterte and Palehound's Ellen Kempner, the latter brought the idea of her mesmerizing experience in a grocery store parking lot to their collaboration. Singing in harmony, the pair's fuzzy song builds with urgency, giving it a loveable Pixies vibe. —Alisha Sweeney, Colorado Public Radio, *Indie 102.3*

Jon Batiste, "Freedom"

This sugary pastiche of Little Richard, Marvin Gaye, Pharrell Williams, Herbie Hancock and OutKast at its poppiest is what



Jon Batiste

every wedding band on earth prays for: music every generation will dance to. If songs could make wishes, this one would beg to be paired with an overly choreographed end credits dance sequence in the sequel to *Hitch* the world deserves. —Matt Silver, *WRTI*

Big Red Machine, "Phoenix"

Memories and indecision look better viewed through the eyes of Robin Pecknold, lead singer of Fleet Foxes, a band that lives in a sepia-toned world. The collective project Big Red Machine embraces Pecknold into the fold with "Phoenix," a lyrically repetitive meditation for deep contemplation while you watch sunlight hit the dust motes. —Jade, *The Current*



Leon Bridges, "Motorbike"

With "Motorbike," the first track released from *Gold-Diggers Sound*, fans of Fort Worth's Grammy-winning crooner and producer Leon Bridges not only witnessed his ongoing evolution as a consummate artist, but also his move into the role of sensualist and visionary. Coupled with Anderson .Paak's spellbinding *Bonnie and Clyde*-inspired video, "Motorbike" celebrates the unalloyed joy of two hearts beating as one. —Gini Mascarro, *KXT*

Brandi Carlile, "Right On Time"

The lead single from Brandi Carlile's stunning 2021 album, "Right On Time" is a song fitting for the pandemic: a call for reconciliation that reminds us all that we lose each other in complacent silence. From the first listen, it quickly became part of the soundtrack to a year when empathy and understanding were more essential than ever. —David Safar, *The Current*



Brandi Carlile

Recordings

Continued from page 37

Cautious Clay, "Dying in the Subtlety"

Although he has songwriting credits on records by Taylor Swift and Billie Eilish, Joshua Karpeh (aka Cautious Clay) remains independent. On his self-released debut full-length, *Deadpan Love*, the Brooklyn-based musician doles out a smooth blend of indie-pop and R&B, anchored by the earworm "Dying in the Subtlety," which boasts an infectious hook that delves into the inner workings of relationships. —Desire Moses, WNRN

Helado Negro, "Gemini and Leo"

Helado Negro's "Gemini and Leo" is a disco-tinged track that Roberto Carlos Lange (aka Helado Negro) says is inspired by he and his partner's astrological signs. Joyful synths and an infectious bassline set the vibe as Lange sings about new beginnings and "dancing on the floor all night." —Brian Burns, WUNC

Hiss Golden Messenger, "Sanctuary"

With a tip of his hat to the late John Prine, M.C. Taylor gives us a comforting entry in the best of 2021 with "Sanctuary." The song seeks shelter in the storm that surrounds us — in the chaos of this year, could there be a more perfect song idea? —Chris Wienk, WMHT

Japanese Breakfast, "Be Sweet"

This year Japanese Breakfast released a landmark album, a video game soundtrack, and a memoir that debuted on the *New York Times* best-seller list — now being made into a movie. And it all kicked off in March with this song. —Justin Barney, 88Nine Radio Milwaukee

Durand Jones & The Indications, "Witchoo"

"Witchoo" is a catchy, R&B funk track that's sure to spice up your party playlist and maybe your love life. Drummer Aaron Frazer's falsetto floats atop a breezy bass and keyboard groove, while lead Durand Jones and backing singers croon rhapsodic about hooking up and getting it on. —Rosemary Welsch, WYEP-Pittsburgh



Lake Street Dive, "Hypotheticals"

Lake Street Dive's latest pop gem may be a direct descendant of the Great American Songbook. Not only has the group crafted an incredibly danceable pop tune, but they've done so with the

kind of deft rhythmic and melodic playfulness you might find from the likes of Gershwin and Kern. —Eric Teel, Jefferson Public Radio

Lord Huron, "Not Dead Yet"

When it was released in May 2021, "Not Dead Yet" by Lord Huron was the band's first new song in three years. The band is best known for its dreamy, cinematic, indie-folk noir songs, and "Not Dead Yet" came out of the gate with uncharacteristic focus and infectious energy, a surprising and welcome change up to their sound. —Bruce Warren, XPN

Manchester Orchestra, "Bed Head"

If it's catharsis you seek, Manchester Orchestra rises to the occasion. Guided by the absorbing vocals of Andy Hull, "Bed Head" is an urgent discourse on the paths one chooses in life, the stripping away of innocence and the purifying grace that can arise out of grief. —Michelle Bacon, 90.9 The Bridge, Kansas City



The Marías

The Marías, "Hush"

After much anticipation, The Marías released their debut album *CINEMA* in 2021. After one listen to "Hush," you can't help but immerse yourself in The Marías' cinematic universe. Front-woman María Zardoya is both teasing and sultry in her lyrical delivery, and the moody music sets the perfect scene. —Erika Bocanegra, KERA

Parker Millsap, "The Real Thing"

The opening acoustic lick of Parker Millsap's "The Real Thing" conjures an optimistic sunrise, and his sweeping falsetto reflects the kind of yearning for meaningful connections that many of us felt throughout the pandemic. As live-music returns, hopefully this tune will remind us to keep our gratitude levels high for the works of arts we love. —Adam Harris, WVPB's Mountain Stage with Kathy Mattea

Arlo Parks, "Hope"

2021 was definitely a star-making year for Arlo Parks, whose talent shone through the challenges of being a rising artist during a pandemic. But songs like "Hope" gave listeners just that with its optimistic refrains of "you're not alone" and "we all have scars." It's clear Arlo Parks has arrived. —Russ Borris, WFUV



Arlo Parks

Nathaniel Rateliff and The Night Sweats, "Survivor"

Building pressure only to release it in a flood of music has been a songwriting technique for eons, but it's never been better utilized than on this punchy, soulful jam. Rateliff and company have settled into this sound and made it their own, in the same way one slides into a perfectly tailored outfit. —Eric Teel, Jefferson Public Radio



Nathaniel Rateliff and The Night Sweats

Allison Russell, "Nightflyer"

Deep and rich, "Nightflyer" is a hypnotic entry from Allison Russell, who embodies both tensile strength and smoldering sensuality. The lyrics are mighty heavy, delivered in a siren's seduction of a song that wraps beauty and danger around you with eyes wide open. —Jessie Scott, Roots Radio

Silk Sonic, "Leave The Door Open"

Silk Sonic's "Leave The Door Open" sounds more like polyester satin — the loftiest compliment I can imagine. Anderson .Paak shared with *Rolling Stone* "We both make feel-good music... because we've been through pain and tragedy." Evoking the real,



Silk Sonic

dusty rose McCoy, it's well-worn music to soothe the weary soul. —Ayana Contreras, *Vocalo*

St. Vincent, "Pay Your Way In Pain"

Here's a song more at home in a modern-art installation than jukeboxes. Surrendering to her retro impulses, Annie Clark's deconstructive vision lashes together vaudeville piano, Eurythmics-inspired synthesizer, a desert-scene guitar lick, a menagerie of R&B-style vocals and caterwauling into a slinky episode of high art attitude. Not since *Midnite Vultures*-era Beck has a mainstream performer so thoroughly reveled in brash tackiness. —David Hyland, Wisconsin Public Radio

Sharon Van Etten and Angel Olsen, "Like I Used To"

If I ever remember 2020 to 2021, I hope it feels like this song. The first reflection after years of averting my eyes from the memory rolodex will be painful — especially when forgotten names or places are revealed — but probably a healthy experience. It also helps when Sharon Van Etten and Angel Olsen are your reflection guide. —Ryan Wen, KUT

Wet Leg, "Chaise Longue"

It's rare for a new band to come out of nowhere and completely blow you away with their very first song, and Wet Leg did just that. "Chaise Longue" was a blast of fresh air the world needed after being cooped up for too long. An instant smash hit, "Chaise Longue" is insanely catchy and infectiously fun, and gives us something to look forward to. The group's debut album drops in April 2022. —Kevin Cole, KEXP

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LIAM MORIARTY

Signing Off

This will be my final column for the *Jefferson Journal*. After nearly 30 years in journalism—more than 10 of those years at JPR—I’m hanging up my press pass and retiring. And looking back over my tenure here, I’m amazed at the progress that’s been made in growing this station into a substantial news organization.

In what I call “my first incarnation” at JPR, I was hired as news director in late 2002. At that time, I was the only professional journalist on staff. Long-time JPR listeners may recall the *Jefferson Daily*, a half-hour regional news magazine that we aired in the 4:30 to 5:00 p.m. slot of NPR’s *All Things Considered*. I led a team of eager community volunteers and students in producing the show Monday through Friday. I’m proud of the enthusiasm and seriousness with which many of my amateur journalists approached their responsibility to tell the stories of their community (even if the results could at times be a bit ... uneven).

In the fall of 2013, when JPR Executive Director Paul Westhelle lured me back from reporting in Europe for my second incarnation at JPR, I became the station’s first-ever full-time reporter. I was tasked with producing long-form news stories of regional significance to be folded into *Morning Edition*. This was at a time when old rivalries among public radio stations in the Northwest were being replaced by a sense of collaboration and cooperation (a development Paul was instrumental in fostering).

Up to that point, as far as many public radio listeners in the north of the state were concerned, Oregon more or less ended at the southern edge of the Willamette Valley. As JPR news reports were more and more frequently picked up by stations in Eugene, Portland, Seattle and beyond, our colleagues to the north started to see Southern Oregon as a valued part of the region’s public radio scene.

JPR had long been hobbled by having to operate out of a cramped basement in the SOU campus. When our new, state-of-the-art broadcast facility opened in July of 2018, it set the stage for a planned expansion of JPR News. As part of that initiative, I was promoted to news director (again). But this time, we hired two full-time reporters, reinforced by a handful of freelancers and part-timers; we had ourselves a real newsroom.

With JPR reporters covering regional stories around Southern Oregon and Northern California, we were able to contribute insightful reporting on wildfires and smoke, on homelessness, on drought, on COVID-19, on demands for racial justice,

on elections, on controversies such as the Jordan Cove Energy Project ... in short, on the broad range of important issues that JPR listeners want and need to know about.

We won our share of national and regional awards, including JPR’s first-ever national Edward R. Murrow award. But more than that, we heard from JPR listeners that they noticed, and appreciated, the more muscular news coverage.

So now, I’m leaving the JPR newsroom in the capable hands of Erik Neumann. You’ve heard Erik’s reporting on a wide range of topics over the past two years, and he’s stepping up as news director on an interim, and perhaps permanent, basis. With my departure, and that of April Ehrlich, one of our original reporters who recently moved on to OPB in Portland, JPR News needs to do some rebuilding. The structure is in place and we’re reaching out nationally to find new reporters to delve into life in this unique region and reflect back the stories that matter most to the people who live here.

I’m proud of the work we’ve done and the service we’ve performed for our neighbors. I move on to my next chapter with professional respect for my colleagues, and with fond feelings for the place in my heart they will always occupy.

Thank you for the opportunity to ply the craft I love in a place as beautiful and nurturing as this. I’ve gotten to go to stunning places, experience amazing things and talk with fascinating people I never would have otherwise.

It’s been a helluva ride. And I wouldn’t have traded it for the world.



Liam Moriarty has been covering news in the Pacific Northwest for nearly 30 years. He’s reported on a wide range of topics — including politics, the environment, business, social issues and more.

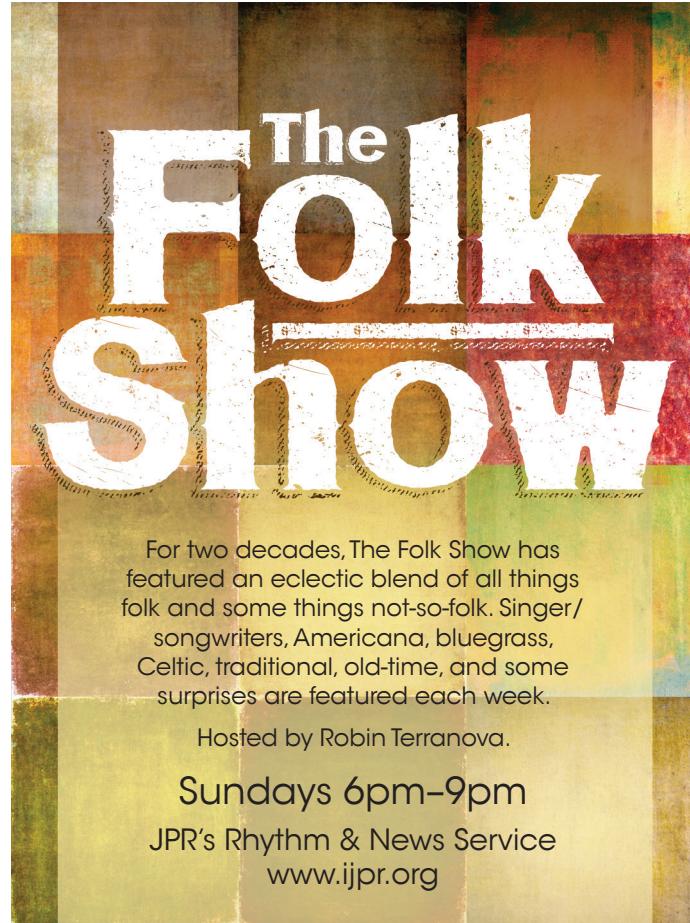
Liam was JPR News Director from 2002 to 2005, reporting and producing the *Jefferson Daily* regional news magazine. After covering the environment in Seattle, then reporting on European issues from France, he returned to JPR in 2013 and was promoted to News Director in 2019 to oversee JPR’s expanded newsroom.

Liam retired as News Director at the end of 2021. He now edits and curates the news on JPR’s website, ijPR.org



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Algorithms Can Be Stacked Against Us

New York City passed a bill in November of 2021 that bans employers from using automated hiring tools unless a yearly bias audit can show that their algorithms won't discriminate based on an applicant's race or gender. It's our nation's first attempt to regulate those invisible snippets of code that are beginning to rule our lives.

Meanwhile, Oregon in August became the first state to ban so-called "love letters" from prospective homebuyers. Letters from buyers help a seller choose between multiple offers in a hot real estate market. But they also could violate fair housing laws by revealing a buyer's race, religion, sexual orientation or marital status.

New York wants to preserve humans making hiring decisions. Oregon wants to limit human factors in life-changing financial decisions. Should an employer consider how a hire will fit with co-workers? Should a home seller favor a buyer who is more likely to match the neighborhood? These difficult questions pervade society, just barely beneath the surface.

They became personally relevant last week, as my son and his wife were in the maternity ward at Riverbend Hospital. They were told they could leave with their new little bundle of joy, but things would go easier if "bundle of joy" had a name first.

They had narrowed their choices to about a dozen over the months. They asked friends to offer their opinions or to add more names. They insisted that the child himself should somehow participate in the process, so they purposely delayed their decision until after he appeared to cast his vote. Until last Tuesday, they knew his sex and his kicking ability, but little else.

As an eviction from the hospital became imminent, they chose the name "River." The name flows easily with no hard stops. It's an unusual name, but not unheard of. The name would be easy to say

Should a home seller favor a buyer who is more likely to match the neighborhood?



around the house or during play dates. They would enjoy having a River around for the next couple of decades.

That lasted about five minutes. (This is important.) Even though "River" had always been included on their Baby Name Bingo card, it wasn't until they gave the name to the child that they considered how it would shape him. It sounds like a stage name. They began to imagine his first job application or career opportunity. "River" could hurt him.

They switched his name to "Calvin" instead. It sounded more serious. Being named after a philosopher who shaped the American imagination isn't so bad, whether it was a dour French theologian or a mischievous character from the comics page.

How will it go for Calvin in a world that's dominated by algorithms? He will grow into his name because the world will make assumptions about him. They'll often know his name before they meet him. That might not be the fairest way to design a world, but it's the only world we've got. Make the most of it, Calvin! I'm sure you will.



Don Kahle (fridays@dksez.com)

writes a column each Friday for

The Register-Guard and archives

past columns at www.dksez.com.

Kahle owned the *Comic News* for ten years, so a progeny named after a cartoon character isn't much of a surprise.

A Legacy of Public Radio...

So much has changed since JPR began in 1969. In many ways, public radio has grown up. What was once a struggling—almost experimental—operation has become a permanent and positive presence in the lives of so many in Southern Oregon and Northern California and across the nation.

We continue to seek and depend on regular membership contributions from supporters, especially new generations of listeners. But in the long run our future will depend, more and more, on special gifts from long-time friends who want to help Jefferson Public Radio become stronger and more stable.

One of the many ways that friends can choose to express their deep commitment to public radio here in our region is by supporting Jefferson Public Radio in their will or trust. This is a way to make a lasting contribution without affecting your current financial security and freedom.

To support Jefferson Public Radio in your will or trust consult your attorney or personal advisor. The legal description of our organization is: "The JPR Foundation, Inc., an Oregon non-profit tax-exempt corporation located in Ashland, Oregon."

If you would like more information about making a bequest to support Jefferson Public Radio call Paul Westhelle at 541-552-6301.



A Nature Notes Sampler II is a broad collection of radio commentaries based on Dr. Frank Lang's popular series that aired on JPR since the publication of the first volume in the year 2000. This collection of essays offers Dr. Lang's same eclectic, often humorous view of the natural world in the mythical State of Jefferson and beyond.

Over 100 of Dr. Lang's commentaries have been collected in this second volume. Make it your first collection of *Nature Notes*, or add it to the original publication for a complete set!

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Go to ijpr.org/FreeWill-JPR to learn more, and get started today!



Curried Butternut Squash Soup With Kale

PHOTO BY ADAM BARTOS

Fonio Crisps

An optional (but recommended!) topping for Pierre Thiam's Curried Butternut Squash Soup with Kale.

MAKES 2 CUPS

Ingredients

1 tablespoon coconut oil, melted, or red palm oil for red crisps, plus more for the baking sheet

2 cups cooked fonio

Directions

1. Preheat the oven to 350°F. Lightly oil a baking sheet.
2. Stir the oil into the fonio until evenly distributed. Spread the fonio on the baking sheet in a thin, even layer. Bake for 30 minutes or until golden brown, stirring every 10 minutes to make sure it cooks evenly and doesn't scorch. Let cool completely. Transfer to an airtight container.



This soup is one of my all-time favorites. It's simple, beautiful and full of flavor. It also happens to be vegan. The optional fonio crisps add a lovely texture.

Recipes from *The Fonio Cookbook: An Ancient Grain Rediscovered*, by Pierre Thiam (Lake Isle Press, 2019).

MAKES 4 SERVINGS

Ingredients

- Kosher Salt
- 1 cup peeled and diced butternut squash
- 1 tablespoon olive oil
- 2 ½ cups coarsely chopped portobello mushrooms
- 1 onion, thinly sliced (about 1 cup)
- 1 baking potato, peeled and diced (about 1 cup)
- 1 tablespoon kosher salt, plus more if needed
- 1 teaspoon freshly ground black pepper
- 1 tablespoon red curry powder
- Pinch of red chili flakes
- 1 quart vegetable broth
- 1 bunch kale, stemmed and cut crosswise into 1-inch ribbons (about 4 cups)
- 2 tablespoons lemon juice
- 1 cup cooked folio
- ¼ cup fonio crisps
- ½ cup chopped fresh cilantro

Directions

1. Make an ice bath by filling a large bowl with ice and cold water. Bring a large pot of salted water to a boil. Blanch the diced butternut squash for about 3 minutes, until just soft but still mostly firm. Using a perforated spoon or sieve, remove the squash from the water and plunge into the ice bath to quickly stop the cooking. When it's cool, drain the squash and set aside.
2. Heat 1 tablespoon of the oil in a large pot over medium-high heat until shimmering. Add the mushroom, onions, and potatoes and season with salt and pepper. Cook, stirring, until the mushrooms and onions are softened, about 2 minutes. Add the curry powder and chili flakes and cook, stirring, until fragrant, about 30 seconds.
3. Add the broth, adjust the heat to maintain an active boil, and cook for about 10 minutes, until the potatoes are cooked through. Add the kale and stir until it has wilted, about 2 minutes more. Stir in the lemon juice and season with salt and pepper. Let cool slightly.
4. Working in batches if necessary, transfer the soup to a blender and blend until smooth. Strain, if desired. Return to the pot and keep warm.
5. To serve, divide the cooked fonio among the four bowls. Add the butternut squash, saving a few tablespoons for garnish. Pour the soup into the bowls and top with the reserved butternut squash, fonio crisps, and cilantro.

Christopher Kimball's Milk Street in downtown Boston—at 177 Milk Street—is home to the editorial offices and cooking school. It also is where they record Christopher Kimball's Milk Street television and radio shows. Milk Street is changing how we cook by searching the world for bold, simple recipes and techniques. For more information, go to 177milkstreet.com. You can hear Milk Street Radio Sundays at 3:00pm on JPR's News & Information service.

Garden

Janet Boggia

In your garden
Rock
Remembers and waits
Rugged, scarred, firm
Born in Earth's fiery center
Rock waits for your glance—for your gentle repositioning hand
Because you *planned* this garden

In your garden
Flowering wood rose
Drinks the sun and waits
Aromatic, vibrant, complex
Born of Earth's seed after an insect's kiss
Nestled and held in its mother's petaled uterus
Wood rose waits for your breath, inhales its scent
Because you *planted* this garden

In your garden
Crow
Sings, caws and waits
Curious, vital, gambols with feathered wings
Born of dinosaur limbs
Formed by air and berries and time
Crow waits for your answering call—and a little extra birdseed
Because you *know* your garden, this bird, this flower, this rock

When in your garden
You delight and remember
That you are born of water
And sun and light and Earth
From the heart of love.

The Pair

Kim Kelly

He landed first.
Of course you could not tell sex
Until she arrived.
Attentive.
Much more than he.
Deferring, even.
But she groomed herself first while he waited.
First.
First she began with her underwings and furthers
While he hang-dogged next to her, waiting.
Waiting.
Finally she turned her head: "Oh, you."
She began on his neck. Then all the way around as he accommodated.
So still, he moved ever so slightly.
Then she delved around his eyes.
Ecstasy.
Pause. And back to herself.
For an eternity, while he waited.
And oh—"are you still here? Well, alright, C'mere."
She repeated the first exercise as he dreamed of this never ending.
And then she flew as he perched for a few minutes, hoping she'd return.
Then he flew too.

POETRY

JANET BOGGIA
KIM KELLY

Janet Boggia is working on the final book of a trilogy on the story of the universe—and why it matters. Select chapters appear in the anthology *Ten Years Around the Table* (2015). Janet has published articles, stories, and professional manuals. She lives in Ashland where she researches, writes, and teaches her passion, the evolutionary story.

Kim Kelly is an insurance agent by day and a playwright and otherwise writer by night. She resides in Eugene, Oregon.

Writers may submit original poetry for publication in *Jefferson Journal*.

Email 3–6 poems, a brief bio, and your mailing address in one attachment to jeffmopoetry@gmail.com, or send 3–6 poems, a brief bio, and a self-addressed, stamped envelope to:

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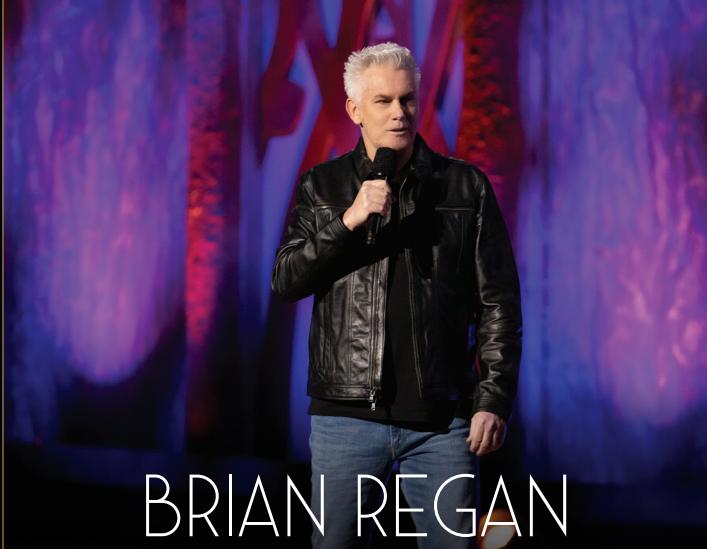
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